# APPENDIX G

## Ambient Air Quality Analysis

# AMBIENT AIR QUALITY ANALYSIS
## Azevedo Dairy #4 Expansion

**1257 W. Roosevelt Road**
**El Nido, CA 95317**
**Merced County**


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June 2021

Project 210505.0111

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# TABLE OF CONTENTS

# LIST OF FIGURES

# LIST OF TABLES

# 1. EXECUTIVE SUMMARY

This document contains the ambient air quality analysis (AAQA) performed on behalf of Environmental Planning Partners, Inc. for an expansion of the existing Azevedo Dairy #4 operation in Merced County, California. The intent of the AAQA is to determine if the proposed dairy expansion has the potential to impact ambient air quality through a violation of the Ambient Air Quality standards (AAQS) or a substantial contribution to existing or projected air quality standards.

Under the provisions of the Federal Clean Air Act, the San Joaquin Valley Air Basin, including Merced County, has been designated as attainment/unclassified for the National Ambient Air Quality Standards (NAAQS) for carbon monoxide (CO), nitrogen dioxide ($NO_2$), and sulfur dioxide ($SO_2$); and attainment for particulate matter between 2.5 and 10 micrometers in diameter ($PM_{10}$). The Merced County portions of the San Joaquin Valley Air Basin have been designated as non-attainment/extreme for the ozone ($O_3$) eight-hour average standard and non-attainment for the particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$) standard. The Merced County portions of the San Joaquin Valley Air Basin have been designated as non-attainment/severe with the State one-hour standard for $O_3$; non-attainment for the $PM_{10}$, $PM_{2.5}$ and eight-hour $O_3$ standards; unclassified for hydrogen sulfide ($H_2S$) and visibility reducing particles; attainment/unclassified for CO; and attainment for all other compounds for which a California Ambient Air Quality Standards (CAAQS) exists. In order to determine whether a project will cause or contribute significantly to an AAQS violation, the maximum impacts attributable to the project are added to the existing background concentrations and are compared to the applicable AAQS. If an AAQS is not exceeded, the project is judged to not cause or contribute significantly to an AAQS violation for the applicable pollutant. If an ambient air quality standard is exceeded, it must be determined whether the project will cause a Prevention of Significant Deterioration (PSD) increment violation, which is achieved by comparing the maximum predicted concentration from the project to the established significant impact level (SIL) for the applicable pollutant. The San Joaquin Valley Air Pollution Control District (SJVAPCD) has developed alternative SILs for fugitive emissions of $PM_{10}$ and $PM_{2.5}$. If a source's maximum impacts are below the applicable SIL, the project is judged to not cause or contribute significantly to an AAQS violation or cause an increment violation.

For the Azevedo Dairy #4 expansion project, maximum predicted concentrations of $NO_2$, $SO_2$, CO, $PM_{10}$, $PM_{2.5}$ and $H_2S$ were predicted based on an analysis of the project-related emissions and air dispersion modeling. Emissions were calculated using generally accepted emission factors. Ambient air concentrations were predicted for the 1-hour, 3-hour, 8-hour, 24-hour and annual averaging periods using the most recent version of EPA's AMS/EPA Regulatory Model - AERMOD (recompiled for the Lakes ISC-AERMOD View interface).

Proposed emissions for the project will not cause or contribute to a violation of any NAAQS or CAAQS for any of the averaging periods for $NO_2$, $SO_2$, CO, or $H_2S$, or cause an increment violation of the SJVAPCD SILs for the annual and 24-hour averaging periods for $PM_{10}$ and $PM_{2.5}$.

In accordance with the SJVAPCD's *Guide for Assessing and Mitigating Air Quality Impacts* (SJVAPCD 2015), the potential impact to air quality attributable to the proposed project is determined to be less than significant.

# 2. INTRODUCTION

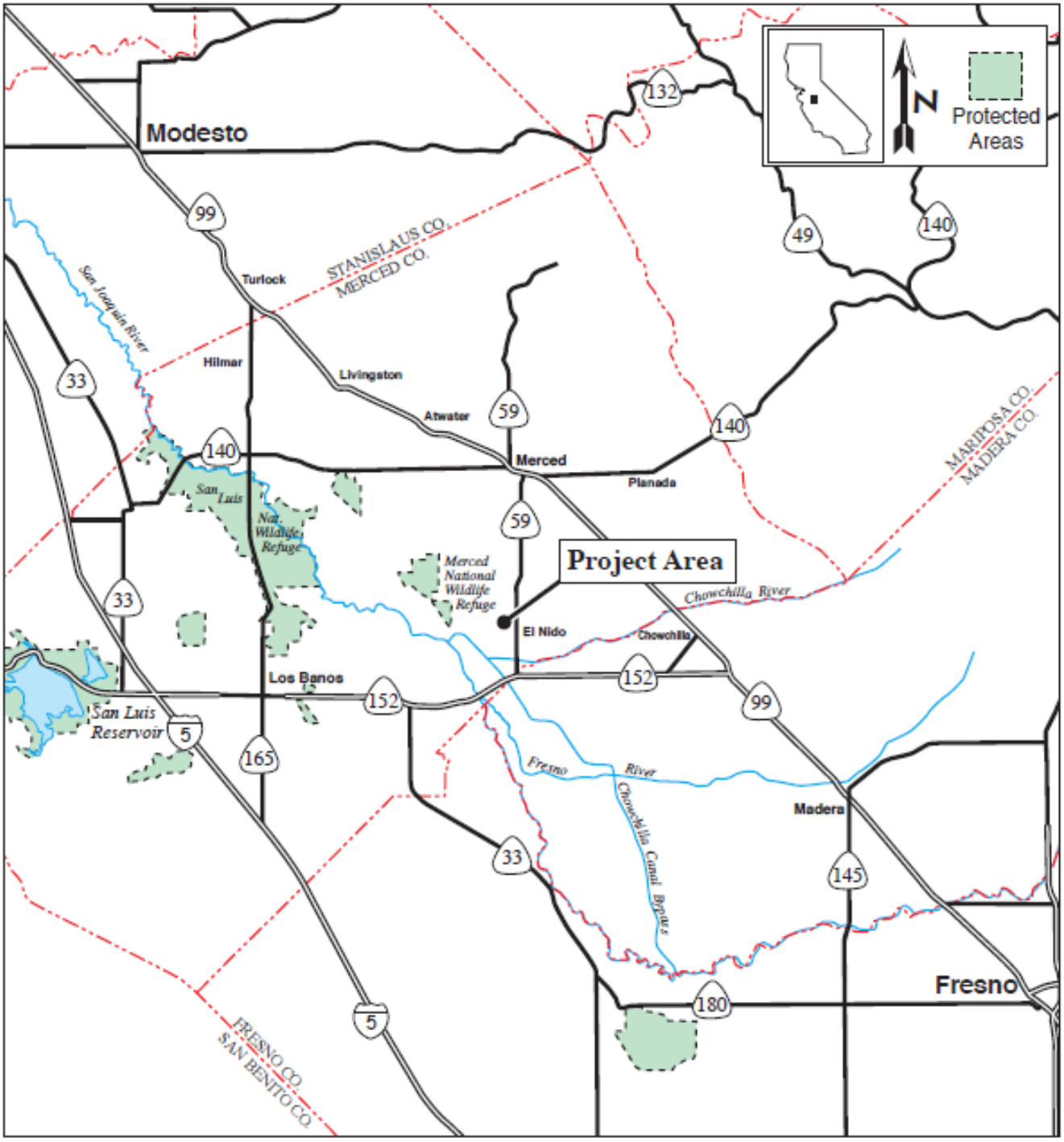
This Ambient Air Quality Analysis (AAQA) is provided as a service of Insight Environmental Consultants, Inc., a Trinity Consultants company performed on behalf of Environmental Planning Partners, Inc. for an expansion of the existing Azevedo Dairy #4 operation in Merced County, California (**Figure 2-1**). This AAQA was prepared pursuant to the San Joaquin Valley Air Pollution Control District's (SJVAPCD) *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI), (SJVAPCD 2015a) and the California Environmental Quality Act (CEQA).

A potentially significant impact to air quality, as defined by the CEQA Appendix G Environmental Checklist Form (not included herein), would occur if the project caused one or more of the following to occur:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard;
- Expose sensitive receptors to substantial pollutant concentrations; and/or
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

The intent of the AAQA is to determine if the project has the potential to impact ambient air quality through a violation of any air quality standard or a substantial contribution to an existing or projected air quality standard. Impacts to ambient air quality are evaluated based on the project-related emission of criteria pollutants. This analysis is limited to the potential impacts resulting from project-related emissions of nitrogen dioxide ($NO_2$), carbon monoxide (CO), sulfur dioxide ($SO_2$), particulate matter between 2.5 and 10 micrometers in diameter ($PM_{10}$), particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$), and hydrogen sulfide ($H_2S$). Project-related emissions are based on the proposed increase in the number of cattle and the additional on-site mobile sources required for the expansion.

**Figure 2-1. Location Map**



## 2.1. PROJECT DESCRIPTION

The existing dairy is located at 1257 W Roosevelt Road in El Nido, California, which is in the County of Merced. The facility will not be located within 1,000 feet of a K-12 school.

After modification, the dairy will house approximately 4,000 head of cattle. The existing and proposed herd configuration is provided in Table 2-1. The dairy will continue to operate 24 hours per day and 365 days per year.

**Table 2-1. Herd Configuration – Existing and Proposed**

| | Current | Proposed | Increment |
|---|---|---|---|
| Milk Cows | 370 | 2,500 | 2,130 |
| Dry Cows | 61 | 500 | 439 |
| Bred Heifers 15-24 mos. | 640 | 334 | -306 |
| Heifers 7-14 mos. | 599 | 333 | -266 |
| Heifers 4-6 mos. | 60 | 333 | 273 |
| Calves 0-3 mos. | 0 | 0 | 0 |
| Bulls | 0 | 0 | 0 |
| **TOTAL** | **1,730** | **4,000** | **2,270** |

The proposed structure construction would include the construction of three new barns totaling 143,950 square feet, a new feed storage area, a new manure storage area, a new mechanical separator and two new wastewater storage ponds.

# 3. BACKGROUND OF AIR QUALITY STANDARDS

Protection of the public health is maintained through the attainment and maintenance of standards for ambient concentrations of various compounds in the atmosphere and the enforcement of emission limits for individual stationary sources. The Federal Clean Air Act requires that the U.S. Environmental Protection Agency (EPA) establish National Ambient Air Quality Standards (NAAQS) to protect the health, safety, and welfare of the public. NAAQS have been established for ozone ($O_3$), carbon monoxide (CO), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), particulate matter ($PM_{10}$ and $PM_{2.5}$) and lead (Pb). California has also adopted ambient air quality standards (CAAQS) for these "criteria" air pollutants that are more stringent than the corresponding NAAQS along with standards for hydrogen sulfide ($H_2S$), vinyl chloride (chloroethene) and visibility reducing particles. In 2010, the U.S. Environmental Protection Agency (EPA) promulgated a new 1-hour $NO_2$ and $SO_2$ primary NAAQS, which are considerably less than the current CAAQS. Compliance with the new standards must be determined for all new and modified sources that are subject to the ambient air quality standard analysis requirement in SJVAPCD Rule 2201, Section 4.14. Current Federal and State ambient air quality standards are presented in **Table 3-1.**

Responsibility for regulation of air quality in California rests with the California Air Resources Board (CARB), the multi-county Air Quality Management Districts and Unified Air Pollution Control Districts, and single-county Air Pollution Control Districts, with oversight responsibility held by the EPA. CARB is responsible for regulation of mobile source emissions, establishment of State ambient air quality standards, research and development, and oversight and coordination of the activities of the regional and local air quality agencies. The regional and local air quality agencies are primarily responsible for regulating stationary source emissions and for monitoring ambient pollutant concentrations.

The Clean Air Act Amendments of 1977 required states to identify areas that were not in attainment with the NAAQS and to develop State Implementation Plans containing strategies to bring these non-attainment areas into compliance. The project location has been designated as attainment /unclassified for the NAAQS for CO, $NO_2$, and $SO_2$; and attainment for $PM_{10}$. The project location has been designated as non-attainment/extreme for the $O_3$ eight-hour average standard and non-attainment for the $PM_{2.5}$ standard. A Federal designation for lead has not been made and NAAQS do not exist for $O_3$ (1-hour average), hydrogen sulfide ($H_2S$), sulfates, vinyl chloride or visibility reducing particles. The project location has been designated as non-attainment/severe with the State one-hour standard for $O_3$, non-attainment for the $PM_{10}$, $PM_{2.5}$, and eight-hour $O_3$ standards; unclassified for $H_2S$ and visibility reducing particles; attainment /unclassified for CO; and attainment for all other compounds for which a State standard exists. **Table 3-2** provides the San Joaquin Valley Air Basin's designation and classification based on the various criteria pollutants under both State and Federal standards.

## Table 3-1. Federal & California Ambient Air Quality Standards

| | | NAAQS | CAAQS |
|---|---|---|---|
| Pollutant | Averaging Time | Concentration | |
| $O_3$ | 8-Hour | 0.070 ppm (137 µg/m³) [c] | 0.070 ppm (137 µg/m³) |
| | 1-Hour | [a] | 0.09 ppm (180 µg/m³) |
| CO | 8-Hour | 9 ppm (10 mg/m³) | 9 ppm (10 mg/m³) |
| | 1-Hour | 35 ppm (40 mg/m³) | 20 ppm (23 mg/m³) |
| $NO_2$ | Annual Average | 53 ppb (100 µg/m³) | 0.030 ppm (56 µg/m³) |
| | 1-Hour | 100 ppb (188.68 µg/m³) | 0.18 ppm (338 µg/m³) |
| $SO_2$ | 3-Hour | 0.5 ppm (1,300 µg/m³) | |
| | 24 Hour | 0.14 ppm (365 µg/m³) | 0.04 ppm (105 µg/m³) |
| | 1-Hour | 75 ppb (196 µg/m³) | 0.25 ppm (655 µg/m³) |
| Particulate Matter (PM10) | Annual Arithmetic Mean | [b] | 20 µg/m³ |
| | 24-Hour | 150 µg/m³ | 50 µg/m³ |
| Fine Particulate Matter (PM2.5) | Annual Arithmetic Mean | 12 µg/m³ | 12 µg/m³ |
| | 24-Hour | 35 µg/m³ | |
| Sulfates | 24-Hour | | 25 µg/m³ |
| Pb [d] | Rolling Three-Month Average | 0.15 µg/m³ | |
| | 30 Day Average | | 1.5 µg/m³ |
| $H_2S$ | 1-Hour | | 0.03 ppm (42 µg/m³) |
| Vinyl Chloride (chloroethene) | 24-Hour | | 0.010 ppm (26 µg/m³) |
| Visibility Reducing particles | 8 Hour (1000 to 1800 PST) | | [e] |

ppm = parts per million
ppb = parts per billion
mg/m3 = milligrams per cubic meter
µg/m ³= micrograms per cubic meter

[a] 1-Hour $O_3$ standard revoked effective June 15, 2005.

[b] Annual PM 10 standard revoked effective December 18, 2006.

[c] EPA finalized the revised (2008) 8-hour $O_3$ standard of 0.075 ppm on March 27, 2008. The 1997 8-hour $O_3$ standard of 0.08 ppm has not been revoked. In the January 19, 2010 Federal Register, EPA proposed to revise the 2008 $O_3$ NAAQS of 0.075 ppm to a NAAQS in the range of 0.060 to 0.070 ppm. EPA expects to finalize the revised NAAQS, which will replace the 0.075 ppm NAAQS, by July 29, 2011.

[d] On October 15, 2008, EPA strengthened the Pb standard.

[e] Statewide Visibility Reducing Particle Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range. (SJVAPCD 2017a and CARB 2017a)

**Table 3-2. San Joaquin Valley Air Basin Attainment Status**

| Pollutant | NAAQS[a] | CAAQS[b] |
|---|---|---|
| $O_3$, 1-hour | No Federal Standard[f] | Nonattainment/Severe |
| $O_3$, 8-hour | Nonattainment/Extreme[e] | Nonattainment |
| $PM_{10}$ | Attainment[c] | Nonattainment |
| $PM_{2.5}$ | Nonattainment[d] | Nonattainment |
| CO | Attainment/Unclassified | Attainment/Unclassified |
| $NO_2$ | Attainment/Unclassified | Attainment |
| $SO_2$ | Attainment/Unclassified | Attainment |
| Pb (Particulate) | No Designation/Classification | Attainment |
| $H_2S$ | No Federal Standard | Unclassified |
| Sulfates | No Federal Standard | Attainment |
| Visibility Reducing particulates | No Federal Standard | Unclassified |
| Vinyl Chloride | No Federal Standard | Attainment |

[a] See 40 CFR Part 81

[b] See CCR Title 17 Sections 60200-60210

[c] On September 25, 2008, EPA redesignated the San Joaquin Valley to attainment for the PM10 National Ambient Air Quality Standard (NAAQS) and approved the PM10 Maintenance Plan.

[d] The Valley is designated nonattainment for the 1997 PM2.5 NAAQS. EPA designated the Valley as nonattainment for the 2006 PM2.5 NAAQS on November 13, 2009 (effective December 14, 2009).

[e] Though the Valley was initially classified as serious nonattainment for the 1997 8-hour $O_3$ standard, EPA approved Valley reclassification to extreme nonattainment in the Federal Register on May 5, 2010 (effective June 4, 2010).

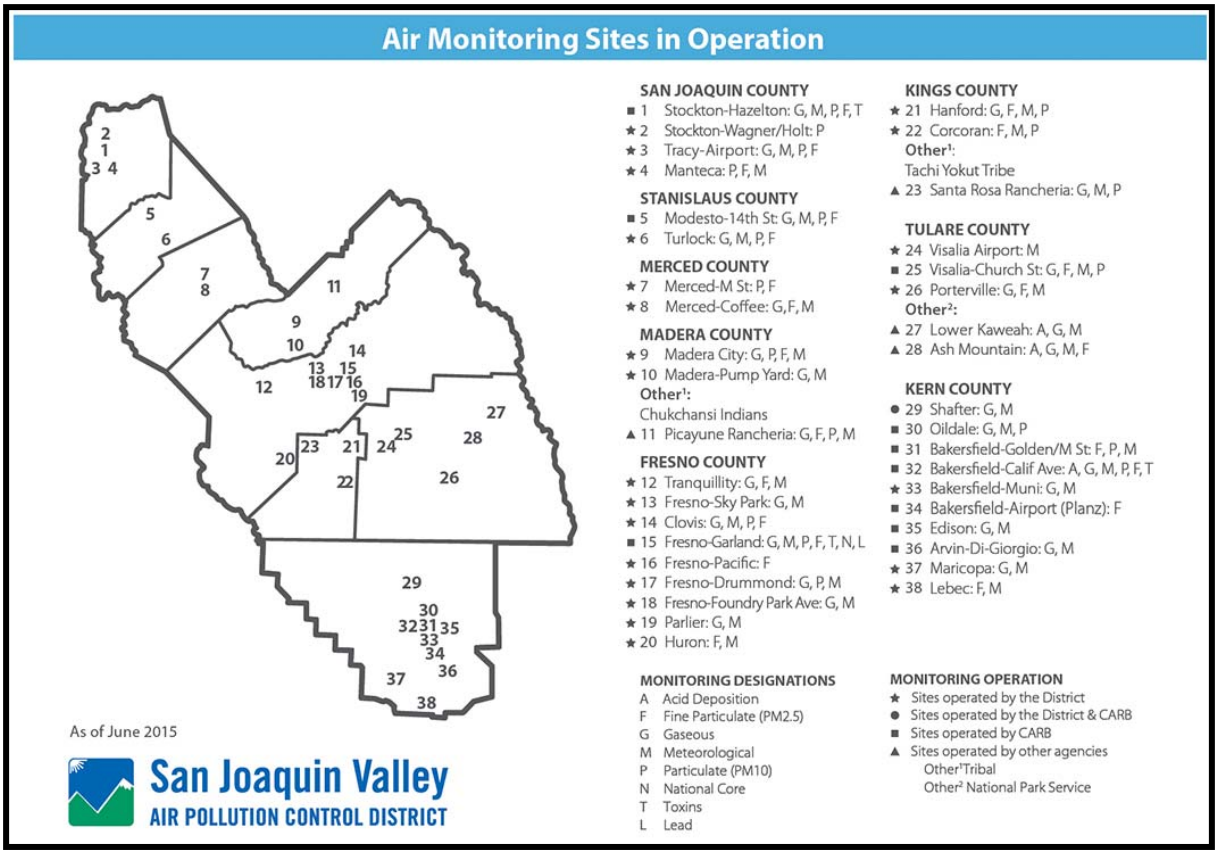
[f] Effective June 15, 2005, the EPA revoked the federal 1-hour $O_3$ standard, including associated designations and classifications. EPA had previously classified the SJVAB as extreme nonattainment for this standard. EPA approved the 2004 Extreme Ozone Attainment Demonstration Plan on March 8, 2010 (effective April 7, 2010). Many applicable requirements for extreme 1-hour $O_3$ nonattainment areas continue to apply to the SJVAB. (SJVAPCD 2017a)

The SJVAPCD along with the CARB operates an air quality monitoring network that provides information on average concentrations of those pollutants for which State or Federal agencies have established ambient air quality standards. Information from the various monitoring stations is available from the agency web sites. A map of the various monitoring stations in the San Joaquin Valley is provided in **Figure 3-1**.

For the purposes of establishing background concentrations of applicable criteria pollutants, this AAQA relied on EPA's AirData and CARB monitoring values, the raw data for which were collected during 2017 and 2018[1] at CARB/SJVAPCD monitoring stations. Background values were selected from various monitoring stations based on closest proximity to the project site. **Table 3-3** provides the background concentrations applicable to the project area. No recent data is available for hydrogen sulfide, vinyl chloride or lead in Merced County or adjacent Counties.

[1] The exception is the one-hour $NO_2$ background value, which EPA requires to be based on a 3-year average. The SJVAPCD's statistical analysis was based on the period 2014 to 2016.

**Figure 3-1. San Joaquin Valley APCD Monitoring Network**




(SJVAPCD 2017b)

**Table 3-3. Background Concentrations for the Project Vicinity**

| Pollutant | Averaging Period | Background Concentration µg/m³ | Reference |
|---|---|---|---|
| $NO_2$ | 1-hour | 83.5 | SJVACPD FTP Server, Merced Co. (SJVAPCD 2017c) |
| | Annual | 12.2 | Merced County, 2019 (CARB 2021) |
| $SO_2$ | 1-hour | 25.1 | Fresno Co., 2019 (USEPA 2021) |
| | 3-hour | 22.6 | Scaled from $SO_2$ 1-hour concentration[2] |
| | 24-hour | 5.9 | Fresno Co., 2019 (USEPA 2021) |
| CO | 1-hour | 2220 | Stanislaus County, 2019 (USEPA 2021) |
| | 8-hour | 1600 | Stanislaus County, 2019 (USEPA 2021) |
| $PM_{2.5}$ | 24-hour | 35.5 | Merced County, 2019 (CARB 2021) |
| | Annual | 9.1 | Merced County, 2019 (CARB 2021) |
| $PM_{10}$ | 24-hour | 99.1 | Merced County, 2019 (CARB 2021) |
| | Annual | 29.8 | Merced County, 2019 (CARB 2021) |

1 The District processed the $NO_2$ monitoring data using the guidance provided in Appendix S of Part 50.
2 The $SO_2$ 3-hour Concentration was scaled from the $SO_2$ 1-hour Concentration using the recommended 0.9 factor (OEHHA 2015).

Merced County, where the project area is located, is included among the eight counties that comprise the SJVAPCD. The SJVAPCD acts as the regulatory agency for air pollution control in the Basin and is the local agency empowered to regulate air pollutant emissions for the air basin. In order to demonstrate that a proposed project will not cause further air quality degradation, projects must demonstrate consistency with the SJVAPCD's adopted Air Quality Attainment Plans.

Air pollution sources associated with stationary sources are regulated through the permitting authority of the SJVAPCD under the New and Modified Stationary Source Review Rule (Rule 2201). Owners of any new or modified equipment that emits, reduces or controls air contaminants, except those specifically exempted by the SJVAPCD, are required to apply for an Authority to Construct and Permit to Operate (Rule 2010). Additionally, best available control technology (BACT) is required on specific types of equipment. Stationary sources are required to offset stationary source emission increases along with increases in cargo carrier emissions if the specified threshold levels are exceeded (Rule 2201, 4.7.1). The SJVAPCD uses this mechanism to ensure that all stationary sources within the project area are subject to the standards of the SJVAPCD to ensure that new or modified sources will not realize a net increase of criteria air pollutants.

Stationary sources subject to SJVAPCD New and Modified Stationary Source Review Rule must also comply with Rule 2201, Section 4.14, Ambient Air Quality Standards, which requires that "emissions from a new or modified Stationary Source shall not cause or make worse the violation of an Ambient Air Quality Standard…the APCO shall take into account the increases in minor and secondary sources emissions as well as the mitigation of emissions through offsets…." The Air Pollution Control Officer (APCO) also has discretion to exempt new or modified sources that are exempt from public notification requirements[2] from this section of Rule 2201. Public notification and publication is required for projects meeting any of the following criteria:

- New Major Sources and Major Modifications;
- Applications which include a new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any one affected pollutant;
- Modifications that increase the Stationary Source Potential to Emit (SSPE1) from a level below the emissions offset threshold level to a level exceeding the emissions offset threshold level for one or more pollutants;
- New Stationary Sources with post-project Stationary Source Potential to Emit (SSPE2) exceeding the emissions offset threshold level for one or more pollutants; or
- Any permitting action resulting in a Stationary Source Project Increase in Permitted Emissions (SSIPE) exceeding 20,000 pounds per year for any one pollutant.

[2] *Public Notification and Publication Requirements*, San Joaquin Valley Air Pollution Control District Rule 2201 Section 5.4, amended April 21, 2011.

This section describes the methodology used to predict the potential impact to ambient air quality attributable to the dispersion of emissions of $NO_2$, $SO_2$, CO, $PM_{10}$, $PM_{2.5}$ and $H_2S$ from the proposed dairy operation expansion.

## 4.1. PROJECT EMISSIONS

The basis for evaluating the potential impact to ambient air quality is the identification of air pollution sources. Emissions based on the current configuration of the dairy are considered to be existing emissions.[3] Based on this fact, the facility's existing emissions are not included in the emissions proposed by the subject project. Therefore, emissions from the dairy modifications will be restricted to the increase in emissions for the proposed increase in the number of cattle (**Table 2-1**) and the additional on-site mobile sources required for the expansion. The potential emission sources with increased emissions addressed in the AAQA are listed in **Table 4-1**.

**Table 4-1. Sources of Potential Emissions**

| Source ID | Description |
|---|---|
| MTI | Milk Truck Idling |
| SMTI | Solid Manure Truck Idling |
| FLT | Feed Loading Tractor |
| MLT | Manure Loading Tractor |
| MTT | Milk Truck Travel |
| SMTT | Solid Manure Truck Travel |
| FBTD1-2 | Feed and Bedding Tractor Delivery |
| SB1-6 | Housing Barns |
| CTT | Commodity Truck Travel |
| WWP1 | Wastewater Ponds |
| CTI | Commodity Truck Idling |
| MST | Manure Scraping Tractor |

Emissions attributable to animal movement were estimated by the SJVAPCD using spreadsheets developed by the SJVAPCD to calculate dairy emissions, which are provided in **Appendix A**. The incremental increases in emissions attributable to animal movement were calculated by comparing the pre- and post-project emissions from each animal housing source. SJVAPCD-approved control efficiencies were applied to $PM_{10}$ emission factors. To generate $PM_{2.5}$ emissions, the $PM_{10}$ emission results for these emission sources were multiplied by the $PM_{2.5}$ fraction of 11.4% from the livestock fugitive dust profile in the California Emission Inventory Data and Reporting System (CEIDARS) developed by CARB (SCAQMD 2006). Housing sources that had an increase in $PM_{10}$ and $PM_{2.5}$ emissions for 24-hour and annual periods are summarized in **Table 4-2**.

[3] Personal Communication with Leland Villalvazo, SJVAPCD, June 15, 2007.

**Table 4-2. Modeled Sources of Emissions Attributable to Animal Movement**

| Source ID | $PM_{10}$ Emissions | | $PM_{2.5}$ Emissions | |
|---|---|---|---|---|
| | Lbs/yr | Lbs/24-hr | Lbs/yr | Lbs/24-hr |
| SB1 | 135.00 | 0.40 | 15.39 | 0.05 |
| SB2 | 504.00 | 1.40 | 57.46 | 0.16 |
| SB3 | 193.00 | 0.60 | 22.00 | 0.07 |
| SB4 | 306.00 | 0.80 | 34.88 | 0.09 |
| SB5 | 917.00 | 2.50 | 104.54 | 0.29 |
| SB6 | 305.00 | 0.80 | 34.77 | 0.09 |

On-site mobile sources for this facility include a diesel-fueled feed loading tractor, a manure loading tractor, manure scraping tractor, a feed delivery tractor, a bedding delivery tractor, milk tankers, solids removal trucks and commodity delivery trucks. The increased herd size will require additional usage and trips for all tractors and trucks.

Emissions for tractors were calculated using the EPA's *Nonroad Compression-Ignition Engines - Exhaust Emission Standards* for the appropriate engine horsepower (HP) and year and load factors for the appropriate engine horsepower from California Emissions Estimator Model (CalEEMod) Appendix D, Tables 3.3 and 3.4 (CAPCOA 2013). Diesel truck running emissions are based on EMFAC2021 emission factors specific to Merced County for vehicle category "T7 Single Other Class 8." Diesel trucks were assumed to have 15 minutes of idling per visit. Diesel truck combustion emissions of $PM_{2.5}$ were set equal to $PM_{10}$ emissions. There will be no increases in 1-hour emissions because additional truck and tractor usage will not occur in the same 1-hour period as the existing equipment. In order to have a possible increase in the worst case one-hour emissions from the Azevedo Dairy #4, one of the three following scenarios would need to occur and be evaluated:

- New equipment must operate at the facility as a result of the project;
- An on-site piece of equipment must operate less than one hour during the worst-case 1-hour period pre-project and then must increase the operational time during the worst-case 1-hour period post-project;
- The project must increase the number trucks entering and exiting the facility over the number of pre-project trucks entering and exiting the facility during the worst-case 1-hour period; or
- A piece of equipment operates in a new area on-site.

The Azevedo Dairy #4 Expansion Project does not propose any new pieces of equipment and the existing equipment currently operates the full hour during the worst-case hour. The project also does not propose an increase over the current worst-case 1-hour period of trucks entering or exiting the facility. Only the bedding delivery tractor, manure scraping tractor and feed delivery tractor will operate in new areas. Based on these findings the worst-case 1-hour period post-project emissions will be equal to or less than the worst-case 1-hour period pre-project for all mobile sources except for the bedding delivery tractor, feed delivery tractor and manure scraping tractor. Therefore, the incremental increase in regard to 1-hour periods for all other equipment and trucks is zero. Based on the same philosophy outlined above for 1-hour emissions there will not be an increase in max 3-hour emissions increases for those same pieces of equipment and trucks.

However, the Project will result in some emissions potentially moving closer to receptors. Feed delivery, bedding delivery and manure scraping tractors will operate closer to some receptors, therefore, hourly emissions from these sources require analysis for 1-hour AAQS. Based on the same philosophy outlined above

for 1-hour emissions; max 3-hour emissions from feed delivery, bedding delivery and scraping will require analysis for AAQS.

Calculation worksheets for emissions from the on-site mobile sources are provided in Appendix B and are summarized in **Table 4-3**.

**Table 4-3. On-Site Mobile Source Combustion Emissions**

| Source ID | $NO_2$ Emissions | | $SO_2$ Emissions | | CO Emissions | | $PM_{10}/PM_{2.5}$ Emissions | |
|---|---|---|---|---|---|---|---|---|
| | Lbs/hr | Lbs/yr | Lbs/hr | Lbs/day | Lbs/hr | Lbs/8-hr | Lbs/24-hr | Lbs/yr |
| MTT | 0.00E+00 | 2.44E-01 | 0.00E+00 | 2.78E-06 | 0.00E+00 | 1.20E-04 | 1.29E-05 | 4.70E-03 |
| CTT | 0.00E+00 | 1.11E+00 | 0.00E+00 | 1.27E-05 | 0.00E+00 | 5.46E-04 | 5.87E-05 | 2.14E-02 |
| SMTT | 0.00E+00 | 5.21E-01 | 0.00E+00 | 3.09E-04 | 0.00E+00 | 0.00E+00 | 1.43E-03 | 1.00E-02 |
| MTI | 0.00E+00 | 4.03E-01 | 0.00E+00 | 2.03E-06 | 0.00E+00 | 1.11E-03 | 3.48E-06 | 1.27E-03 |
| CTI | 0.00E+00 | 8.06E-01 | 0.00E+00 | 4.06E-06 | 0.00E+00 | 2.22E-03 | 6.96E-06 | 2.54E-03 |
| SMTI | 0.00E+00 | 1.66E-01 | 0.00E+00 | 4.35E-05 | 0.00E+00 | 0.00E+00 | 7.46E-05 | 5.22E-04 |
| FLT | 0.00E+00 | 1.63E+01 | 0.00E+00 | 7.46E-04 | 0.00E+00 | 3.90E-01 | 2.23E-03 | 8.13E-01 |
| FBTD1 | 8.95E-02 | 3.25E+01 | 1.50E-03 | 3.59E-03 | 8.62E-01 | 2.42E+00 | 1.07E-02 | 1.63E+00 |
| FBTD2 | 5.53E-02 | 2.01E+01 | 9.27E-04 | 2.22E-03 | 5.33E-01 | 1.50E+00 | 6.62E-03 | 1.01E+00 |
| MST | 2.41E-02 | 2.04E+00 | 5.71E-04 | 2.45E-03 | 4.26E-01 | 1.82E+00 | 7.30E-03 | 1.02E-01 |
| MLT | 0.00E+00 | 4.04E+01 | 0.00E+00 | 6.05E-03 | 0.00E-01 | 0.00E+00 | 1.26E-02 | 1.26E-01 |

The new wastewater ponds' $H_2S$ emissions were assumed to be 10% of the NH3 wastewater ponds' emissions. This assumption was taken from the SJVAPCD's dairy calculator. The new lagoons calculated $H_2S$ emissions are 1,288 lbs/year.

## 4.2. DISPERSION MODELING

The most recent version of EPA's AMS/EPA Regulatory Model - AERMOD (recompiled for the Lakes ISC-AERMOD View interface) was used to predict the dispersion of emissions from the proposed dairy for the 1-hour, 3-hour, 8-hour, 24-hour and annual averaging periods. All of the AERMOD regulatory default parameters were employed. Rural dispersion parameters were used because the facility and surrounding land are considered "rural" under the Auer land use classification method.

The animal housing areas emissions were modeled as area sources. Unit emission rates for the area sources of 1 g/sec divided by the area of the source were input into AERMOD. The travel route for the feed and bedding delivery tractors, milk trucks, solids removal trucks, and commodity trucks were modeled as a line sources, which represents a series of volume sources, with a unit emission rate of 1 g/sec. The feed loading tractor, manure loading tractor, manure scraping tractor, milk truck idling, solids removal truck idling and commodity truck idling were modeled as point sources, with a unit emission rate of 1 g/sec.

### 4.2.1. Meteorological Data

The SJVAPCD provided meteorological data for Merced County, California to be used for projects within Merced County. SJVAPCD-approved, AERMET processed meteorological datasets for calendar years 2013 through 2017[4] was input into AERMOD. This was the most recent available dataset available at the time the modeling runs were conducted.

### 4.2.2. Receptors

Existing land uses in the area where the dairy and proposed expansion are located are predominantly agriculture. There are scattered rural residences in the general area of the project; most of which are associated with local agricultural operations. A fenceline grid was used to define a dense receptor grid around the property boundary using Lakes ISC-AERMOD View interface. The fenceline spacing between receptors along the fenceline was set to 25 meters. Two tiers were specified, the first extending a distance of 100 meters from the fenceline with 25 meter spacing and the second extending an additional 200 meters with 50 meter tier spacing. The spacing between receptors perpendicular to the fenceline was set to 25 meters. A total of 1,513 receptors were generated for the fenceline grid.

## 4.3. MODELING RESULTS

Plot files generated by AERMOD were imported to a Microsoft Access based post-processor AAQA–PSD (developed by the SJVAPCD), where unit emission rates were converted to pollutant-specific emission rates based on the emissions provided in **Tables 4-2** and **4-3**. Background concentrations from **Table 3-3** were input to AAQA–PSD. Based on this data, a report was generated which provides the maximum concentrations per emission source, background concentration and total concentration for each averaging period. For each averaging period, the total concentration is compared to the applicable AAQS and designated as a "pass" or "fail." This method yields conservative overall concentrations since it combines the max concentration per emissions source even if they are not the same receptor or the same day, therefore, if a pollutant exceeds the threshold using this methodology a refined AERMOD run is conducted where pollutant-specific emission rates are entered directly into AERMOD to calculate the actual maximum concentration for each receptor from all sources. For this Project, a refined AERMOD run was conducted for $PM_{10}$ 24-hour concentrations.

As shown in the AAQA–PSD report provided in Appendix C and **Table 4-4**, air dispersion modeling demonstrates that the maximum impacts attributable to the project, when considered in addition to the existing available background concentrations, are below the applicable ambient air quality standard for all of the averaging periods for $NO_2$, $SO_2$, CO and $H_2S$. Additionally, PM2.5 annual concentrations were also below applicable ambient air quality standards when considered in addition to the existing available background data.

Compliance with the Federal $NO_2$ one-hour standard was based on a modeling procedure developed by the SJVAPCD (SJVAPCD 2010). The most conservative approach, referred to as Tier I option 1, requires that the maximum one-hour modeling concentration be added to the SJVAPCD's Air Quality Design Value for the nearest monitoring station (see **Table 3-3**).

[4] Provided via website, San Joaquin Valley Air Pollution Control District (SJVAPCD), ftp://12.219.204.27/public/Modeling/Meteorological_Data/AERMET_v16216/Modesto_23258/

**Table 4-4. Predicted Ambient Air Quality Impacts**

| Pollutant | Averaging Period | Background ($\mu g/m^3$) | Project ($\mu g/m^3$) | Project + Background ($\mu g/m^3$) | NAAQS ($\mu g/m^3$) | CAAQS ($\mu g/m^3$) |
|---|---|---|---|---|---|---|
| $NO_2$ | 1-hour | 83.5 | 18.22 | 101.72 | 188.68 | 339 |
| | Annual | 12.2 | 0.05 | 14.25 | 100 | --- |
| $SO_2$ | 1-hour | 25.1 | 0.50 | 20.8 | 195 | 655 |
| | 3-hour | 22.6 | 0.30 | 18.6 | 1300 | --- |
| | 24-hour | 5.9 | 0.01 | 7.31 | --- | 105 |
| CO | 1-hour | 2220 | 293.76 | 3624 | 40,000 | 23,000 |
| | 8-hour | 1600 | 487.06 | 3437 | 10,000 | 10,000 |
| $PM_{10}$ | 24-hour | 99.1 | 9.05 | 151.75 | 150 | 50 |
| | Annual | 29.8 | 2.04 | 36.64 | 50 | 20 |
| $PM_{2.5}$ | 24-hour | 35.5 | 1.33 | 89.53 | 35 | --- |
| | Annual | 9.1 | 0.23 | 15.33 | 12 | 12 |
| $H_2S$ | 1-hour | N/A | 36.49 | 0.00 | --- | 42 |

Background 24-hour and annual concentrations of $PM_{10}$ and 24-hour concentrations of $PM_{2.5}$ exceed their respective ambient air quality standards. Therefore, these averaging periods for $PM_{2.5}$ and $PM_{10}$ are evaluated in accordance with the Prevention of Significant Deterioration (PSD) procedure in Title 40, Code of Federal Regulations (CFR), Part 52.21. It is EPA's policy to use significant impact levels (SIL) to determine whether a proposed new or modified source will cause or contribute significantly to an AAQS or PSD increment violation. The SJVAPCD has developed SILs for fugitive emissions of $PM_{10}$ and $PM_{2.5}$.[5] As shown in **Tables 4-2** and **4-3**, 99% of the project's predicted $PM_{10}$ concentration is attributable to fugitive $PM_{10}$ emissions from animal movement. Therefore, SJVAPCD SILs are applicable to this project. If a source's maximum impacts are below the SIL, the source is judged to not cause or contribute significantly to an AAQS or increment violation.

A comparison of the proposed impact from the project to the SJVAPCD SILs, as shown in **Table 4-5**, demonstrates that the modeled $PM_{10}$ and $PM_{2.5}$ impacts directly attributable to the project are below the applicable SJVAPCD significance levels for the 24-hour and annual averaging periods of $PM_{10}$ and $PM_{2.5}$ and therefore will not cause an increment violation of any SJVAPCD SIL.

**Table 4-5. Comparison of Maximum Modeled Project Impact with Significance Thresholds**

| Pollutant | Averaging Period | Predicted Concentration ($\mu g/m^3$) | SJVAPCD SIL ($\mu g/m^3$) |
|---|---|---|---|
| $PM_{10}$ | 24-hour | 9.05 | 10.4 |
| | Annual | 2.04 | 2.08 |
| $PM_{2.5}$ | 24-hour | 1.33 | 2.5 |
| | Annual | 0.23 | 0.63 |

Based on the results of the air dispersion modeling, comparisons to AAQSs and applicable SILs, *the impact to air quality is not considered to be significant.*

[5] Personal Communication with Yu Vu, San Joaquin Valley Air Pollution Control District, August 15, 2012

# 5. CONCLUSIONS

In accordance with the San Joaquin Valley Air Pollution Control District's *Guide for Assessing and Mitigating Air Quality Impacts* air dispersion modeling demonstrates that the ambient air quality impact attributable to the proposed project is determined to be less than significant based on the following conclusions:

- Proposed emissions for the project will not cause or contribute to a violation of any NAAQS or CAAQS for any of the averaging periods for $NO_2$, $SO_2$, CO, or H2S or cause an increment violation of the SJVAPCD SILs for $PM_{10}$ and $PM_{2.5}$.

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# APPENDIX A: FUGITIVE EMISSION ESTIMATION WORKSHEETS

**Name**

## Cow Housing Summary

| | | | | |
|---|---|---|---|---|
| **Applicability** | Use this spreadsheet to enter data from the Engineer's Dairy Calculator. Entries here will be linked to other worksheets. After completion, proceed to RMR worksheet for further entries. | | | |
| *Author or updater* | Matthew Cegielski | *Last Update* | September 24, 2018 | |
| **Facility:** | Azevedo Dairy #4 | | 0 | Not Set |
| **ID#:** | | | | |
| **Project #:** | | | | |

*Notes:

### Potential to Emit - Cow Housing

| Housing Name(s) or #(s) | Type of Cow | # of Cows | VOC (lb/hr) | VOC (lb/yr) | $NH_3$ (lb/hr) | $NH_3$ (lb/yr) | $PM_{10}$ (lb/hr) | $PM_{10}$ (lb/yr) |
|---|---|---|---|---|---|---|---|---|
| Corral 1-4 | Support Stock | 333 | -0.5333 | -4,665 | -0.7667 | -6,713 | -0.9375 | -8,187 |
| Barn 1 | Milk | 700 | 0.2083 | 1,837 | 1.4458 | 12,664 | 0.0167 | 135 |
| Barn 2 | Milk | 1000 | 0.9375 | 8,178 | 3.9708 | 34,771 | 0.0583 | 504 |
| Barn 3 | Dry | 300 | 0.1542 | 1,345 | 0.5958 | 5,227 | 0.0250 | 193 |
| Barn 4 | Support Stock | 334 | 0.1667 | 1,463 | 0.3833 | 3,367 | 0.0333 | 306 |
| Barn 5 | Milk/Dry | 1000 | 1.0542 | 9,246 | 3.9500 | 34,589 | 0.1042 | 917 |
| Barn 6 | Support Stock | 333 | 0.1667 | 1,459 | 0.3833 | 3,357 | 0.0333 | 305 |

Copy and paste values from the corresponding table in the Engineer Dairy Calculator's RMR Summary worksheet. Paste values only with matched destination formatting. Ensure the same names are lined up by row number. Zero and null entries will be highlighted in red after entry.

| SSIPE RMR Summary | | | | | | | |
|---|---|---|---|---|---|---|---|
| | PM10 lb/hr | PM10 lb/yr | VOC lb/hr | VOC lb/yr | NH3 lb/hr | NH3 lb/yr | H2S lb/yr |
| Milking Parlor | - | - | 0.10 | 845 | 0.03 | 291 | - |
| Cow Housing | -0.67 | -5,827 | 2.15 | 18,863 | 9.96 | 87,262 | - |
| Liquid Manure | - | - | 0.54 | 4,730 | 3.07 | 26,921 | - |
| Solid Manure | - | - | 0.12 | 1,034 | 0.73 | 6,431 | - |
| Feed Handling | - | - | 2.57 | 22,550 | - | - | - |
| Lagoon/Storage Pond | - | - | 0.26 | 2,300 | 1.47 | 12,885 | 1,288 |
| Land Application (Liquid) | - | - | 0.28 | 2,446 | 1.60 | 14,016 | - |
| Land Application (Solid) | - | - | 0.07 | 584 | 0.39 | 3,431 | - |
| Solid Manure Storage | - | - | 0.05 | 402 | 0.35 | 3,066 | - |

| SSIPE Total Herd Summary | |
|---|---|
| Change in Milk Cows | 2,130 |
| Change in Dairy Head | 2,270 |
| Change in Dairy Head (Flushed) | 2,270 |

Rev. May 7, 2019

# Pre-Project Facility Information

1. Does this facility house Holstein or Jersey cows? Holstein
   Most facilities house Holstein cows unless explicitly stated on the PTO or application.
2. Does the facility have an anaerobic treatment lagoon? no
3. Does the facility land apply liquid manure? yes
   Answering "yes" assumes worst case.
4. Does the facility land apply solid manure? yes
   Answering "yes" assumes worst case.
5. Is any scraped manure sent to a lagoon/storage pond? yes
   Answering "yes" assumes worst case.

**Pre-Project Herd Size**

| Herd | Flushed Freestalls | Scraped Freestalls | Flushed Corrals | Scraped Corrals | Total # of Animals |
|---|---|---|---|---|---|
| Milk Cows | 370 | | | | 370 |
| Dry Cows | 61 | | | | 61 |
| Support Stock (Heifers, Calves, and Bulls) | 300 | | | 999 | 1,299 |
| Large Heifers | | | | | 0 |
| Medium Heifers | | | | | 0 |
| Small Heifers | | | | | 0 |
| Bulls | | | | | 0 |

| | Calf Hutches | | | | Calf Corrals | | |
|---|---|---|---|---|---|---|---|
| | Aboveground Flushed | Aboveground Scraped | On-Ground Flushed | On-Ground Scraped | Flushed | Scraped | Total # of Calves |
| Calves | | | | | | | 0 |

**Total Herd Summary**

| | |
|---|---|
| Total Milk Cows | 370 |
| Total Mature Cows | 431 |
| Support Stock (Heifers, Calves, and Bulls) | 1,299 |
| Total Calves | 0 |
| Total Dairy Head | 1,730 |

**Pre-Project Silage Information**

| Feed Type | Max # Open Piles | Max Height (ft) | Max Width (ft) |
|---|---|---|---|
| Corn | | | |
| Alfalfa | | | |
| Wheat | | | |

# Post-Project Facility Information

1. Does this facility house Holstein or Jersey cows? Holstein
   Most facilities house Holstein cows unless explicitly stated on the PTO or application.
2. Does the facility have an anaerobic treatment lagoon? no
3. Does the facility land apply liquid manure? yes
   Answering "yes" assumes worst case.
4. Does the facility land apply solid manure? yes
   Answering "yes" assumes worst case.
5. Is any scraped manure sent to a lagoon/storage pond? no
   Answering "yes" assumes worst case.
6. Does this project result in an increase or relocation of uncovered surface area for any lagoon/storage pond? yes

**NOTE: An increase in total lagoon/storage pond surface area may result in an increase in H2S emissions. The District's Technical Services Division may need to conduct H2S modeling.**

**Post-Project Herd Size**

| Herd | Flushed Freestalls | Scraped Freestalls | Flushed Corrals | Scraped Corrals | Total # of Animals |
|---|---|---|---|---|---|
| Milk Cows | 2,500 | | | | 2,500 |
| Dry Cows | 500 | | | | 500 |
| Support Stock (Heifers, Calves, and Bulls) | 667 | | | 333 | 1,000 |
| Large Heifers | | | | | 0 |
| Medium Heifers | | | | | 0 |
| Small Heifers | | | | | 0 |
| Bulls | | | | | 0 |

| | Calf Hutches | | | | Calf Corrals | | |
|---|---|---|---|---|---|---|---|
| | Aboveground Flushed | Aboveground Scraped | On-Ground Flushed | On-Ground Scraped | Flushed | Scraped | Total # of Calves |
| Calves | | | | | | | 0 |

**Total Herd Summary**

| | |
|---|---|
| Total Milk Cows | 2,500 |
| Total Mature Cows | 3,000 |
| Support Stock (Heifers, Calves, and Bulls) | 1,000 |
| Total Calves | 0 |
| Total Dairy Head | 4,000 |

**Post-Project Silage Information**

| Feed Type | Max # Open Piles | Max Height (ft) | Max Width (ft) |
|---|---|---|---|
| Corn | | | |
| Alfalfa | | | |
| Wheat | | | |

This spreadsheet serves only as a resource to calculate potential emissions from dairies, and may not reflect the final emissions used by the District due to parameters not addressed in this spreadsheet and/or omissions from the spreadsheet. Any other permittable equipment (e.g. IC engines, gasoline tanks, etc.) at a facility will need to be calculated separately. All final calculations used in permitting projects will be conducted by District staff.

| Control Measure | PM10 Control Efficiency |
|---|---|
| Shaded corrals (milk and dry cows) | 16.7% |
| Shaded corrals (heifers and bulls) | 8.3% |
| Downwind shelterbelts | 12.5% |
| Upwind shelterbelts | 10% |
| Freestall with no exercise pens and non-manure based bedding | 90% |
| Freestall with no exercise pens and manure based bedding | 80% |
| Fibrous layer in dusty areas (i.e. hay, etc.) | 10% |
| Bi-weekly corral/exercise pen scraping and/or manure removal using a pull type manure harvesting equipment in morning hours when moisture in air except during periods of rainy weather | 15% |
| Sprinkling of open corrals/exercise pens | 15% |
| Feeding young stock (heifers and calves) near dusk | 10% |

## Pre-Project PM10 Mitigation Measures

**Pre-Project PM10 Mitigation Measures**

| | Housing Name(s) or #(s) | Type of Housing | Type of cow | Total # of cows in Each Housing Structure(s) | Maximum Design Capacity of Each Structure | # of Combined Housing Structures in row | Shaded Corrals | Downwind Shelterbelts | Upwind Shelterbelts | No exercise pens, non-manure bedding | No exercise pens, manure bedding | Fibrous layer | Bi-weekly scraping Corrals/Pens | Sprinkling Corrals/Pens | Feed Young Stock Near Dusk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Corral 1-4 | open corral | support stock | 999 | 999 | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2 | Barn 1 | saudi style barn | milk cows | 370 | 370 | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3 | Barn 2 | saudi style barn | support stock | 240 | 240 | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4 | Barn 2 | saudi style barn | dry cows | 61 | 61 | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5 | Barn 3 | saudi style barn | support stock | 60 | 60 | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | | | **Pre-Project Total # of Cows** | 1,730 | | | | | | | | | | | |

**Pre-Project PM10 Control Efficiencies and Emission Factors**

| | Housing Name(s) or #(s) | Type of Housing | Type of cow | Total # of cows in Each Housing Structure(s) | Maximum Design Capacity of Each Structure | Uncontrolled EF (lb/hd-yr) | Shaded Corrals | Downwind Shelterbelts | Upwind Shelterbelts | No exercise pens, non-manure bedding | No exercise pens, manure bedding | Fibrous layer | Bi-weekly scraping Corrals/Pens | Sprinkling Corrals/Pens | Feed Young Stock Near Dusk | Controlled EF (lb/hd-yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Corral 1-4 | open corral | support stock | 999 | 999 | 10.550 | | | | | | | | | | 10.55 |
| 2 | Barn 1 | saudi style barn | milk cows | 370 | 370 | 1.370 | | | | | | | | | | 1.37 |
| 3 | Barn 2 | saudi style barn | support stock | 240 | 240 | 1.370 | | | | | | | | | | 1.37 |
| 4 | Barn 2 | saudi style barn | dry cows | 61 | 61 | 1.370 | | | | | | | | | | 1.37 |
| 5 | Barn 3 | saudi style barn | support stock | 60 | 60 | 1.370 | | | | | | | | | | 1.37 |
| | | | **Pre-Project Total # of Cows** | 1,730 | | | | | | | | | | | | |

# Post-Project PM10 Mitigation Measures

**Post-Project PM10 Mitigation Measures**

| | Housing Name(s) or #(s) | Type of Housing | Type of cow | Total # of cows in Each Housing Structure(s) | Maximum Design Capacity of Each Structure | # of Combined Housing Structures in row | Shaded Corrals | Downwind Shelterbelts | Upwind Shelterbelts | No exercise pens, non-manure bedding | No exercise pens, manure bedding | Fibrous layer | Bi-weekly scraping Corrals/Pens | Sprinkling Corrals/Pens | Feed Young Stock Near Dusk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Corral 1-4 | open corral | support stock | 333 | 333 | | ☐ | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ |
| 2 | Barn 1 | saudi style barn | milk cows | 700 | 700 | | ☐ | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ |
| 3 | Barn 2 | saudi style barn | milk cows | 1,000 | 1,000 | | ☐ | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ |
| 4 | Barn 3 | saudi style barn | dry cows | 300 | 300 | | ☐ | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ |

**Post-Project PM10 Mitigation Measures for New Housing Units at an Expanding Dairy**

| | Housing Name(s) or #(s) | Type of Housing | Type of cow | Total # of cows in Each Housing Structure(s) | Maximum Design Capacity of Each Structure | # of Combined Housing Structures in row | Shaded Corrals | Downwind Shelterbelts | Upwind Shelterbelts | No exercise pens, non-manure bedding | No exercise pens, manure bedding | Fibrous layer | Bi-weekly scraping Corrals/Pens | Sprinkling Corrals/Pens | Feed Young Stock Near Dusk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Barn 4 | saudi style barn | support stock | 334 | 334 | | ☐ | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ |
| 2 | Barn 5 | saudi style barn | milk cows | 800 | 800 | | ☐ | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ |
| 3 | Barn 5 | saudi style barn | dry cows | 200 | 200 | | ☐ | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ |
| 4 | Barn6 | saudi style barn | support stock | 333 | 333 | | ☐ | ☑ | ☑ | ☐ | ☐ | ☐ | ☐ | ☑ | ☐ |
| | | | **Post-Project Total # of Cows** | 4,000 | (The post-project total includes | | | | dairy cows already on-site and | | | | new cows from the expansion.) | | |

**Post-Project PM10 Control Efficiencies and Emission Factors**

| | Housing Name(s) or #(s) | Type of Housing | Type of cow | Total # of cows in Each Housing Structure(s) | Maximum Design Capacity of Each Structure | Uncontrolled EF (lb/hd-yr) | Shaded Corrals | Downwind Shelterbelts | Upwind Shelterbelts | No exercise pens, non-manure bedding | No exercise pens, manure bedding | Fibrous layer | Bi-weekly scraping Corrals/Pens | Sprinkling Corrals/Pens | Feed Young Stock Near Dusk | Controlled EF (lb/hd-yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Corral 1-4 | open corral | support stock | 333 | 333 | 10.550 | | 12.5% | 10% | | | | | 15% | | 7.06 |
| 2 | Barn 1 | saudi style barn | milk cows | 700 | 700 | 1.370 | | 12.5% | 10% | | | | | 15% | | 0.92 |
| 3 | Barn 2 | saudi style barn | milk cows | 1,000 | 1,000 | 1.370 | | 12.5% | 10% | | | | | 15% | | 0.92 |
| 4 | Barn 3 | saudi style barn | dry cows | 300 | 300 | 1.370 | | 12.5% | 10% | | | | | 15% | | 0.92 |

**Post-Project PM10 Control Efficiencies and Emission Factors for New Housing Emissions Units**

| | Housing Name(s) or #(s) | Type of Housing | Type of cow | Total # of cows in Each Housing Structure(s) | Maximum Design Capacity of Each Structure | Uncontrolled EF (lb/hd-yr) | Shaded Corrals | Downwind Shelterbelts | Upwind Shelterbelts | No exercise pens, non-manure bedding | No exercise pens, manure bedding | Fibrous layer | Bi-weekly scraping Corrals/Pens | Sprinkling Corrals/Pens | Feed Young Stock Near Dusk | Controlled EF (lb/hd-yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Barn 4 | saudi style barn | support stock | 334 | 334 | 1.370 | | 12.5% | 10% | | | | | 15% | | 0.92 |
| 2 | Barn 5 | saudi style barn | milk cows | 800 | 800 | 1.370 | | 12.5% | 10% | | | | | 15% | | 0.92 |
| 3 | Barn 5 | saudi style barn | dry cows | 200 | 200 | 1.370 | | 12.5% | 10% | | | | | 15% | | 0.92 |
| 4 | Barn6 | saudi style barn | support stock | 333 | 333 | 1.370 | | 12.5% | 10% | | | | | 15% | | 0.92 |

## Pre-Project Potential to Emit - Cow Housing

| | Pre-Project Potential to Emit - Cow Housing | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Housing Name(s) or #(s) | Type of Cow | # of Cows | Controlled VOC EF (lb/hd-yr) | Controlled NH3 EF (lb/hd-yr) | Controlled PM10 EF (lb/hd-yr) | VOC (lb/day) | VOC (lb/yr) | NH3 (lb/day) | NH3 (lb/yr) | PM10 (lb/day) | PM10 (lb/yr) |
| 1 | Corral 1-4 | support stock | 999 | 6.13 | 10.08 | 10.55 | 16.8 | 6,124 | 27.6 | 10,070 | 28.9 | 10,539 |
| 2 | Barn 1 | milk cows | 370 | 14.2 | 38.38 | 1.37 | 14.4 | 5,254 | 38.9 | 14,199 | 1.4 | 507 |
| 3 | Barn 2 | support stock | 240 | 6.13 | 10.08 | 1.37 | 4.0 | 1,471 | 6.6 | 2,419 | 0.9 | 329 |
| 4 | Barn 2 | dry cows | 61 | 7.88 | 19.44 | 1.37 | 1.3 | 481 | 3.2 | 1,186 | 0.2 | 84 |
| 5 | Barn 3 | support stock | 60 | 6.13 | 10.08 | 1.37 | 1.0 | 368 | 1.7 | 605 | 0.2 | 82 |
| | **Pre-Project Total # of Cows** | | **1,730** | | | | **37.5** | **13,698** | **78.0** | **28,479** | **31.6** | **11,541** |

*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows.

| Pre-Project Totals | | | | | | |
|---|---|---|---|---|---|---|
| Total # of Cows | VOC (lb/day) | VOC (lb/yr) | NH3 (lb/day) | NH3 (lb/yr) | PM10 (lb/day) | PM10 (lb/yr) |
| **1,730** | **37.5** | **13,698** | **78.0** | **28,479** | **31.6** | **11,541** |

Calculations:

Annual PE 1 for each pollutant (lb/yr) = Controlled EF (lb/hd-yr) x # of cows (hd)
Daily PE1 for each pollutant (lb/day) = [Controlled EF (lb/hd-yr) x # of cows (hd)] ÷ 365 (day/yr)

## Post-Project Potential to Emit - Cow Housing

| | Post-Project Potential to Emit - Cow Housing | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Housing Name(s) or #(s) | Type of Cow | # of Cows | Controlled VOC EF (lb/hd-yr) | Controlled NH3 EF (lb/hd-yr) | Controlled PM10 EF (lb/hd-yr) | VOC (lb/day) | VOC (lb/yr) | NH3 (lb/day) | NH3 (lb/yr) | PM10 (lb/day) | PM10 (lb/yr) |
| 1 | Corral 1-4 | support stock | 333 | 4.38 | 10.08 | 7.06 | 4.0 | 1,459 | 9.2 | 3,357 | 6.4 | 2,352 |
| 2 | Barn 1 | milk cows | 700 | 10.13 | 38.38 | 0.92 | 19.4 | 7,091 | 73.6 | 26,863 | 1.8 | 642 |
| 3 | Barn 2 | milk cows | 1,000 | 10.13 | 38.38 | 0.92 | 27.8 | 10,130 | 105.1 | 38,376 | 2.5 | 917 |
| 4 | Barn 3 | dry cows | 300 | 5.71 | 19.44 | 0.92 | 4.7 | 1,713 | 16.0 | 5,832 | 0.8 | 275 |
| | **Post-Project # of Cows (non-expansion)** | | **2,333** | | | | **55.9** | **20,393** | **203.9** | **74,428** | **11.5** | **4,186** |

*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows.

| | Post-Project Potential to Emit - Cow Housing: New Housing Units at an Expanding Dairy | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Housing Name(s) or #(s) | Type of Cow | # of Cows | Controlled VOC EF (lb/hd-yr) | Controlled NH3 EF (lb/hd-yr) | Controlled PM10 EF (lb/hd-yr) | VOC (lb/day) | VOC (lb/yr) | NH3 (lb/day) | NH3 (lb/yr) | PM10 (lb/day) | PM10 (lb/yr) |
| 1 | Barn 4 | support stock | 334 | 4.38 | 10.08 | 0.92 | 4.0 | 1,463 | 9.2 | 3,367 | 0.8 | 306 |
| 2 | Barn 5 | milk cows | 800 | 10.13 | 38.38 | 0.92 | 22.2 | 8,104 | 84.1 | 30,701 | 2.0 | 734 |
| 3 | Barn 5 | dry cows | 200 | 5.71 | 19.44 | 0.92 | 3.1 | 1,142 | 10.7 | 3,888 | 0.5 | 183 |
| 4 | Barn6 | support stock | 333 | 4.38 | 10.08 | 0.92 | 4.0 | 1,459 | 9.2 | 3,357 | 0.8 | 305 |
| | **Total # of Cows From Expansion** | | **1,667** | | | | **33.3** | **12,168** | **113.2** | **41,313** | **4.1** | **1,528** |

*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows.

| Post-Project Totals | | | | | | |
|---|---|---|---|---|---|---|
| Total # of Cows | VOC (lb/day) | VOC (lb/yr) | NH3 (lb/day) | NH3 (lb/yr) | PM10 (lb/day) | PM10 (lb/yr) |
| **4,000** | **89.2** | **32,561** | **317.1** | **115,741** | **15.6** | **5,714** |

Calculations:

Annual PE 2 for each pollutant (lb/yr) = Controlled EF (lb/hd-yr) x # of cows (hd)
Daily PE2 for each pollutant (lb/day) = [Controlled EF (lb/hd-yr) x # of cows (hd)] ÷ 365 (day/yr)

# Increase in Emissions

| SSIPE (lb/yr) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | NOx | SOx | PM10 | CO | VOC | NH3 | H2S |
| Milking Parlor | 0 | 0 | 0 | 0 | 845 | 291 | 0 |
| Cow Housing | 0 | 0 | -5,827 | 0 | 18,863 | 87,262 | 0 |
| Liquid Manure | 0 | 0 | 0 | 0 | 4,730 | 26,921 | N/A |
| Solid Manure | 0 | 0 | 0 | 0 | 1,034 | 6,431 | 0 |
| Feed Handling | 0 | 0 | 0 | 0 | 22,550 | 0 | 0 |
| **Total** | **0** | **0** | **-5,827** | **0** | **48,021** | **120,906** | **N/A** |

| Total Daily Change in Emissions (lb/day) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | NOx | SOx | PM10 | CO | VOC | NH3 | H2S |
| Milking Parlor | 0.0 | 0.0 | 0.0 | 0.0 | 2.3 | 0.8 | 0.0 |
| Cow Housing | 0.0 | 0.0 | -16.0 | 0.0 | 51.7 | 239.1 | 0.0 |
| Liquid Manure | 0.0 | 0.0 | 0.0 | 0.0 | 12.9 | 73.8 | N/A |
| Solid Manure | 0.0 | 0.0 | 0.0 | 0.0 | 2.8 | 17.7 | 0.0 |
| Feed Handling | 0.0 | 0.0 | 0.0 | 0.0 | 61.8 | 0.0 | 0.0 |
| **Total** | **0.0** | **0.0** | **-16.0** | **0.0** | **131.5** | **331.4** | **N/A** |

| Total Annual Change in Non-Fugitive Emissions (Major Source Emissions) (lb/yr) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | NOx | SOx | PM10 | CO | VOC | NH3 | H2S |
| Milking Parlor | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cow Housing | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Liquid Manure | 0 | 0 | 0 | 0 | 2,274 | 0 | N/A |
| Solid Manure | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Feed Handling | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **0** | **0** | **0** | **0** | **2,274** | **0** | **N/A** |

# APPENDIX B: ON-SITE MOBILE SOURCE COMBUSTION EMISSION WORKSHEETS

**Table 1. Truck Travel: Diesel Particulate Matter Increased Emissions**

| Type of Vehicles | Source | Round Trip Distance (mi) | Emission Factor (g/mi) | Increase in Trucks/Year | Emissions (lb/yr) | Emissions (lb/day) |
|---|---|---|---|---|---|---|
| Milk Tankers | MTT | 0.02 | 0.14 | 730 | 4.70E-03 | 1.29E-05 |
| Commodity Delivery | CTT | 0.05 | 0.14 | 1460 | 2.14E-02 | 5.87E-05 |
| Manure Transport | SMTT | 0.11 | 0.14 | 300 | 1.00E-02 | 1.43E-03 |

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2021) with an Aggregate Fleet Mix Traveling 10 MPH.
Note 2: Increases in trucks/yr is from the Initial Study, page 17

**Table 2. Truck Idling: Diesel Particulate Matter Increased Emissions**

| Type of Vehicles | Source | Emission Factor (g/hr-vehicle) | Minutes Idling/Truck | Increase in Trucks/Year | Emissions (lb/yr) | Emissions (lb/day) |
|---|---|---|---|---|---|---|
| Milk Tankers | MTI | 0.003 | 15 | 730 | 1.27E-03 | 3.48E-06 |
| Commodity Delivery | CTI | 0.003 | 15 | 1460 | 2.54E-03 | 6.96E-06 |
| Manure Transport | SMTI | 0.003 | 15 | 300 | 5.22E-04 | 7.46E-05 |

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2021) with an Aggregate Fleet Mix Idling.
Note 2: Increases in trucks/yr is from the Initial Study, page 17

**Table 3. Tractors: Diesel Particulate Matter Increased Emissions**

| | Source (# Volume Sources) | HP | Load Factor | Hours/Year | Emission Factor (g/hp-hr) | Emissions (lb/yr) | Emissions (lb/day) |
|---|---|---|---|---|---|---|---|
| Feed Loading | FLT | 183 | 0.37 | 365 | 1.49E-02 | 8.13E-01 | 2.23E-03 |
| Bedding Delivery | FBTD1-2 | 140 | 0.37 | 360.00 | 1.49E-02 | 6.13E-01 | 1.18E-02 |
| Manure Scraping | MST | 140 | 0.37 | 60 | 1.49E-02 | 1.02E-01 | 7.30E-03 |
| Manure Loading | MLT | 173 | 0.37 | 60.00 | 1.49E-02 | 1.26E-01 | 1.26E-02 |
| Feed Delivery | FBTD1-2 | 455 | 0.37 | 365 | 1.49E-02 | 2.02E+00 | 5.54E-03 |

Note1 : Emissions based on EPA's *Nonroad Compression-Ignition* Engines - Exhaust Emission Standards for the appropriate year and HP
https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100OA05.pdf

Note 2: Increase in hours/day was provided by the project applicant

**Table 4. Truck Travel: NO Increased Emissions**

| | Source | Round Trip Distance (mi) | Emission Factor (g/mi) | Increase in Trucks/Year | Emissions (lb/yr) | Emissions (lb/Max hr) | |
|---|---|---|---|---|---|---|---|
| Milk Tankers | MTT | 0.02 | 7.27 | 730 | 2.44E-01 | 0.00E+00 | *Max Hour Turcks not expected to increase |
| Commodity Delivery | CTT | 0.05 | 7.27 | 1460 | 1.11E+00 | 0.00E+00 | *Max Hour Turcks not expected to increase |
| Manure Transport | SMTT | 0.11 | 7.27 | 300 | 5.21E-01 | 0.00E+00 | *Max Hour Turcks not expected to increase |

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2021) with an Aggregate Fleet Mix Traveling 10 MPH.
Note 2: Increases in trucks/yr is from the Initial Study, page 17

**Table 5. Truck Idling: NOx Increased Emissions**

| Type of Vehicles | Source | Emission Factor (g/hr-vehicle) | Minutes Idling/Truck | Increase in Trucks/Year | Emissions (lb/yr) | Emissions (lb/Max hr) |
|---|---|---|---|---|---|---|
| Milk Tankers | MTI | 1.00 | 15 | 730 | 4.03E-01 | 0.00E+00 |
| Commodity Delivery | CTI | 1.00 | 15 | 1460 | 8.06E-01 | 0.00E+00 |
| Manure Transport | SMTI | 1.00 | 15 | 300 | 1.66E-01 | 0.00E+00 |

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2021) with an Aggregate Fleet Mix Idling.
Note 2: Increases in trucks/yr is from the Initial Study, page 17

**Table 6. Tractors: NOx Increased Emissions**

| | Source (# Volume Sources) | HP | Load Factor | Hours/day | Days/Year | Emission Factor (g/hp-hr) | Emissions (lb/yr) | Emissions (lb/Max hr) | |
|---|---|---|---|---|---|---|---|---|---|
| Feed Loading | FLT | 183 | 0.37 | 1 | 365 | 2.98E-01 | 1.625E+01 | 0.00E+00 | *No increase is expected for max hr. |
| Bedding Delivery | FBTD1-2 | 140 | 0.37 | 6.92 | 52 | 2.98E-01 | 1.23E+01 | 3.41E-02 | |
| Manure Scraping | MST | 140 | 0.37 | 4.29 | 14 | 2.98E-01 | 2.04E+00 | 3.41E-02 | |
| Manure Loading | MLT | 173 | 0.37 | 8.57 | 10 | 2.98E-01 | 3.61E+00 | 0.00E+00 | *No increase is expected for max hr. |
| Feed Delivery | FBTD1-2 | 455 | 0.37 | 1 | 365 | 2.98E-01 | 4.04E+01 | 1.11E-01 | |

Note1 : Emissions based on EPA's *Nonroad Compression-Ignition* Engines - Exhaust Emission Standards for the appropriate year and HP https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100OA05.pdf
Note 2: Increase in hours/day was provided by the project applicant
Note 3: Load factors from CalEEMod's Appendix D Table 3.3 *OFFROAD Default Horsepower and Load Factors*

**Table 7. Truck Travel: SOx Increased Emissions**

| Type of Vehicles | Source | Round Trip Distance (mi) | Emission Factor (g/mi) | Increase in Trucks/Year | Emissions (lb/yr) | Emissions (lb/Max 24-hr) | Emissions (lb/Max 3-hr) | Emissions (lb/Max 1-hr) | |
|---|---|---|---|---|---|---|---|---|---|
| Milk Tankers | MTT | 0.02 | 0.03 | 730 | 1.02E-03 | 2.78E-06 | 0.00E+00 | 0.00E+00 | *No 3-Hr or 1-Hr Max increase |
| Commodity Delivery | CTT | 0.05 | 0.03 | 1460 | 4.63E-03 | 1.27E-05 | 0.00E+00 | 0.00E+00 | *No 3-Hr or 1-Hr Max increase |
| Manure Transport | SMTT | 0.11 | 0.03 | 300 | 2.17E-03 | 3.09E-04 | 0.00E+00 | 0.00E+00 | *No 3-Hr or 1-Hr Max increase |

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2021) with an Aggregate Fleet Mix Traveling 10 MPH.
Note 2: Increases in trucks/yr is from the Initial Study, page 17

**Table 8. Truck Idling: SOx Increased Emissions**

| Type of Vehicles | Source | Emission Factor (g/hr-vehicle) | Minutes Idling/Truck | Increase in Trucks/Year | Emissions (lb/yr) | Emissions (lb/Max 24-hr) | Emissions (lb/Max 3-hr) | Emissions (lb/Max 1-hr) | |
|---|---|---|---|---|---|---|---|---|---|
| Milk Tankers | MTI | 0.002 | 15 | 730 | 7.41E-04 | 2.03E-06 | 0.00E+00 | 0.00E+00 | *No 3-Hr or 1-Hr Max increase |
| Commodity Delivery | CTI | 0.002 | 15 | 1460 | 1.48E-03 | 4.06E-06 | 0.00E+00 | 0.00E+00 | *No 3-Hr or 1-Hr Max increase |
| Manure Transport | SMTI | 0.002 | 15 | 300 | 3.04E-04 | 4.35E-05 | 0.00E+00 | 0.00E+00 | *No 3-Hr or 1-Hr Max increase |

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2021) with an Aggregate Fleet Mix Idling.
Note 2: Increases in trucks/yr is from the Initial Study, page 17

**Table 9. Tractors: SOx Increase Emissions**

| | Source (# Volume Sources) | HP | Load Factor | Hours/day | Days/Year | Emission Factor (g/hp-hr) | Emissions (lb/yr) | Emissions (lb/Max 24-hr) | Emissions (lb/Max 3-hr) | Emissions (lb/Max 1-hr) |
|---|---|---|---|---|---|---|---|---|---|---|
| Feed Loading | FLT | 183 | 0.37 | 1 | 365 | 5.00E-03 | 2.72E-01 | 7.46E-04 | 0.00E+00 | 0.00E+00 |
| Bedding Delivery | FBTD1-2 | 140 | 0.37 | 6.92 | 52 | 5.00E-03 | 2.06E-01 | 3.95E-03 | 1.71E-03 | 5.71E-04 |
| Manure Scraping | MST | 140 | 0.37 | 4.29 | 14 | 5.00E-03 | 3.43E-02 | 2.45E-03 | 1.71E-03 | 5.71E-04 |
| Manure Loading | MLT | 173 | 0.37 | 8.57 | 10 | 5.00E-03 | 6.05E-02 | 6.05E-03 | 0.00E+00 | 0.00E+00 |
| Feed Delivery | FBTD1-2 | 455 | 0.37 | 1 | 365 | 5.00E-03 | 6.77E-01 | 1.86E-03 | 5.57E-03 | 1.86E-03 |

Note1 : Emissions based on CalEEmod's Appendix D, dafualts for the appropriate year and HP
Note 2: Increase in hours/day was provided by the project applicant
Note 3: Load factors from CalEEMod's Appendix D Table 3.3 *OFFROAD Default Horsepower and Load Factors*

**Table 10. Truck Travel: CO Increased Emissions**

| Type of Vehicles | Source | Round Trip Distance (mi) | Emission Factor (g/mi) | Increase in Trucks/Year | Emissions (lb/Max 8-yr) | Emissions (lb/Max hr) | |
|---|---|---|---|---|---|---|---|
| Milk Tankers | MTT | 0.02 | 1.30 | 730 | 1.20E-04 | 0.00E+00 | *No 1-Hr Max increase |
| Commodity Delivery | CTT | 0.05 | 1.30 | 1460 | 5.46E-04 | 0.00E+00 | *No 1-Hr Max increase |
| Manure Transport | SMTT | 0.11 | 1.30 | 300 | 0.00E+00 | 0.00E+00 | *No 8-Hr or 1-Hr Max increase |

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2021) with an Aggregate Fleet Mix Travelir
Note 2: Increases in trucks/yr is from the Initial Study, page 17

**Table 11. Truck Idling: CO Increased Emissions**

| Type of Vehicles | Source | Emission Factor (g/hr-vehicle) | Minutes Idling/Truck | Increase in Trucks/Year | Emissions (lb/Max hr) | Emissions (lb/Max 8-hr) | |
|---|---|---|---|---|---|---|---|
| Milk Tankers | MTI | 1.01 | 15 | 730 | 0.00E+00 | 1.11E-03 | *No 1-Hr Max increase |
| Commodity Delivery | CTI | 1.01 | 15 | 1460 | 0.00E+00 | 2.22E-03 | *No 1-Hr Max increase |
| Manure Transport | SMTI | 1.01 | 15 | 300 | 0.00E+00 | 0.00E+00 | *No 8-Hr or 1-Hr Max increase |

Note 1: Running emission factors for vehicle category "T7 Single Other Class 8" were obtained from the EMFAC2021 Web Database for Merced County (2021) with an Aggregate Fleet Mix Idling.
Note 2: Increases in trucks/yr is from the Initial Study, page 17

**Table 12. Tractors: CO Increase Emissions**

| | Source (# Volume Sources) | HP | Load Factor | Hours/day | Days/Year | Emission Factor (g/hp-hr) | Emissions (lb/yr) | Emissions (lb/Max hr) | Emissions (lb/Max 8-hr) |
|---|---|---|---|---|---|---|---|---|---|
| Feed Loading | FLT | 183 | 0.37 | 1 | 365 | 2.61E+00 | 1.42E+02 | 0.00E+00 | 3.90E-01 |
| Bedding Delivery | FBTD1-2 | 140 | 0.37 | 6.92 | 52.00 | 3.73E+00 | 1.53E+02 | 4.26E-01 | 2.95E+00 |
| Manure Scraping | MST | 140 | 0.37 | 4.29 | 14.00 | 3.73E+00 | 2.55E+01 | 4.26E-01 | 1.82E+00 |
| Manure Loading | MLT | 173 | 0.37 | 8.57 | 10.00 | 3.73E+00 | 4.51E+01 | 0.00E+00 | 0.00E+00 |
| Feed Delivery | FBTD1-2 | 455 | 0.37 | 1 | 365 | 2.61E+00 | 3.54E+02 | 9.69E-01 | 9.69E-01 |

Note1 : Emissions based on EPA's *Nonroad Compression-Ignition* Engines - Exhaust Emission Standards for the appropriate year and HP
https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100OA05.pdf
Note 2: Increase in hours/day was provided by the project applicant
Note 3: Load factors from CalEEMod's Appendix D Table 3.3 *OFFROAD Default Horsepower and Load Factors*

# APPENDIX C: AAQA-PSD REPORT FOR $NO_2$, CO, $SO_2$, $PM_{10}$, $PM_{2.5}$ AND $H_2S$

## AAQA for Azevedo 4 Expansion
## All Values are in ug/m^3

| | NOx 1 Hour | NOx Annual | CO 1 Hour | CO 8 Hour | SOx 1 Hour | SOx 3 Hour | SOx 24 Hour | PM10 24 Hour | PM10 Annual | PM2.5 24 Hour | PM2.5 Annual | H2S 1 Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CTI | 0.00E+00 | 6.37E-05 | 0.00E+00 | 2.30E-03 | 0.00E+00 | 0.00E+00 | 3.41E-06 | 1.22E-06 | 1.55E-07 | 1.22E-06 | 1.55E-07 | 0.00E+00 |
| CTT | 0.00E+00 | 1.16E-04 | 0.00E+00 | 1.08E-03 | 0.00E+00 | 0.00E+00 | 9.26E-05 | 1.51E-05 | 1.96E-06 | 1.51E-05 | 1.96E-06 | 0.00E+00 |
| FBDT1 | 5.32E+00 | 2.01E-02 | 2.05E+02 | 1.56E+01 | 3.57E-01 | 1.74E-01 | 3.51E-03 | 1.39E-02 | 1.37E-03 | 1.39E-02 | 1.37E-03 | 0.00E+00 |
| FBDT2 | 1.19E+01 | 2.47E-02 | 7.10E+01 | 1.63E+01 | 1.24E-01 | 1.10E-01 | 1.61E-03 | 8.45E-03 | 6.14E-04 | 8.45E-03 | 6.14E-04 | 0.00E+00 |
| FLT | 0.00E+00 | 8.80E-04 | 0.00E+00 | 3.73E-01 | 0.00E+00 | 0.00E+00 | 6.26E-04 | 3.19E-04 | 3.51E-05 | 3.19E-04 | 3.51E-05 | 0.00E+00 |
| MLT | 0.00E+00 | 3.55E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.50E-03 | 2.19E-03 | 8.26E-06 | 2.19E-03 | 8.26E-06 | 0.00E+00 |
| MST | 1.04E+00 | 8.15E-04 | 1.75E+01 | 4.55E+02 | 2.35E-02 | 2.11E-02 | 3.80E-04 | 2.85E-03 | 2.17E-05 | 2.85E-03 | 2.17E-05 | 0.00E+00 |
| MTI | 0.00E+00 | 4.44E-05 | 0.00E+00 | 1.29E-03 | 0.00E+00 | 0.00E+00 | 2.79E-06 | 6.86E-07 | 1.19E-07 | 6.86E-07 | 1.19E-07 | 0.00E+00 |
| MTT | 0.00E+00 | 3.25E-05 | 0.00E+00 | 1.95E-04 | 0.00E+00 | 0.00E+00 | 1.15E-05 | 3.49E-06 | 5.49E-07 | 3.49E-06 | 5.49E-07 | 0.00E+00 |
| SB1 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.14E-01 | 3.15E-02 | 2.43E-02 | 3.59E-03 | 0.00E+00 |
| SB2 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.85E+00 | 3.20E-01 | 2.11E-01 | 3.64E-02 | 0.00E+00 |
| SB3 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.42E-01 | 3.05E-02 | 3.90E-02 | 3.48E-03 | 0.00E+00 |
| SB4 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.84E-01 | 4.24E-02 | 5.52E-02 | 4.83E-03 | 0.00E+00 |
| SB5 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.02E+00 | 1.43E+00 | 8.00E-01 | 1.63E-01 | 0.00E+00 |
| SB6 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.53E+00 | 1.82E-01 | 1.74E-01 | 2.07E-02 | 0.00E+00 |
| SMTI | 0.00E+00 | 1.65E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.78E-05 | 1.50E-05 | 3.75E-08 | 1.50E-05 | 3.75E-08 | 0.00E+00 |
| SMTT | 0.00E+00 | 6.23E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.68E-03 | 4.07E-04 | 1.03E-06 | 4.07E-04 | 1.03E-06 | 0.00E+00 |
| WWP1 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.65E+01 |
| All Sources* | - | - | - | - | - | - | - | 9.05E+00 | - | - | - | - |
| Background | 8.35E+01 | 1.22E+01 | 2.22E+03 | 1.60E+03 | 2.51E+01 | 2.26E+01 | 5.90E+00 | 9.91E+01 | 2.98E+01 | 3.55E+01 | 9.10E+00 | 0.00E+00 |
| **Facility Totals** | 1.02E+02 | 1.23E+01 | 2.51E+03 | 2.09E+03 | 2.56E+01 | 2.29E+01 | 5.91E+00 | 1.08E+02 | 3.18E+01 | 3.68E+01 | 9.33E+00 | 3.65E+01 |
| **AAQS** | 188.68 | 100 | 23000 | 10000 | 195 | 1300 | 105 | 50 | 20 | 35 | 12 | 42 |
| | **Pass** | **Pass** | **Pass** | **Pass** | **Pass** | **Pass** | **Pass** | **Fail** | **Fail** | **Fail** | **Pass** | **Pass** |

**Refined Model Results.*

### District and EPA's Significance Level (ug/m^3)

| | NOx 1 Hour | NOx Annual | CO 1 Hour | CO 8 Hour | SOx 1 Hour | SOx 3 Hour | SOx 24 Hour | PM10 24 Hour | PM10 Annual | PM2.5 24 Hour | PM2.5 Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Totals w/o Background** | | | | | | | | **9.05** | **2.04** | **1.33** | **0.23** |
| **SIL** | **0** | **1** | **2000** | **500** | **0** | **25** | **5** | **10.4** | **2.08** | **2.5** | **0.63** |
| | | | | | | | | **Pass** | **Pass** | **Pass** | **Pass** |

## *AAQA Emission (g/sec)*

| *Device* | NOx 1 Hour | NOx Annual | CO 1 Hour | CO 8 Hour | SOx 1 Hour | SOx 3 Hour | SOx 24 Hour | PM10 24 Hour | PM10 Annual | PM2.5 24 Hour | PM2.5 Annual | H2S 1 Hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CTI | 0.00E+00 | 1.16E-05 | 0.00E+00 | 3.46E-05 | 0.00E+00 | 0.00E+00 | 2.13E-08 | 3.65E-08 | 3.65E-08 | 3.65E-08 | 3.65E-08 | 0.00E+00 |
| CTT | 0.00E+00 | 1.60E-05 | 0.00E+00 | 8.59E-06 | 0.00E+00 | 0.00E+00 | 6.65E-08 | 3.07E-07 | 3.08E-07 | 3.07E-07 | 3.08E-07 | 0.00E+00 |
| FBDT1 | 1.13E-02 | 4.67E-04 | 1.09E-01 | 3.82E-02 | 1.89E-04 | 1.89E-04 | 1.89E-05 | 5.62E-05 | 2.34E-05 | 5.62E-05 | 2.34E-05 | 0.00E+00 |
| FBDT2 | 6.97E-03 | 2.89E-04 | 6.71E-02 | 2.36E-02 | 1.17E-04 | 1.17E-04 | 1.17E-05 | 3.48E-05 | 1.45E-05 | 3.48E-05 | 1.45E-05 | 0.00E+00 |
| FLT | 0.00E+00 | 2.34E-04 | 0.00E+00 | 6.13E-03 | 0.00E+00 | 0.00E+00 | 3.92E-06 | 1.17E-05 | 1.17E-05 | 1.17E-05 | 1.17E-05 | 0.00E+00 |
| MLT | 0.00E+00 | 5.81E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.17E-05 | 6.63E-05 | 1.81E-06 | 6.63E-05 | 1.81E-06 | 0.00E+00 |
| MST | 3.04E-03 | 2.93E-05 | 5.37E-02 | 2.04E+00 | 7.19E-05 | 7.19E-05 | 1.29E-05 | 3.83E-05 | 1.47E-06 | 3.83E-05 | 1.47E-06 | 0.00E+00 |
| MTI | 0.00E+00 | 5.80E-06 | 0.00E+00 | 1.75E-05 | 0.00E+00 | 0.00E+00 | 1.07E-08 | 1.83E-08 | 1.83E-08 | 1.83E-08 | 1.83E-08 | 0.00E+00 |
| MTT | 0.00E+00 | 3.51E-06 | 0.00E+00 | 1.89E-06 | 0.00E+00 | 0.00E+00 | 1.46E-08 | 6.75E-08 | 6.76E-08 | 6.75E-08 | 6.76E-08 | 0.00E+00 |
| SB1 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.94E-03 | 1.94E-03 | 2.21E-04 | 2.21E-04 | 0.00E+00 |
| SB2 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.25E-03 | 7.25E-03 | 8.27E-04 | 8.27E-04 | 0.00E+00 |
| SB3 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.78E-03 | 2.78E-03 | 3.17E-04 | 3.17E-04 | 0.00E+00 |
| SB4 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.40E-03 | 4.40E-03 | 5.02E-04 | 5.02E-04 | 0.00E+00 |
| SB5 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.32E-02 | 1.32E-02 | 1.50E-03 | 1.50E-03 | 0.00E+00 |
| SB6 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.39E-03 | 4.39E-03 | 5.00E-04 | 5.00E-04 | 0.00E+00 |
| SMTI | 0.00E+00 | 2.39E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.28E-07 | 3.92E-07 | 7.51E-09 | 3.92E-07 | 7.51E-09 | 0.00E+00 |
| SMTT | 0.00E+00 | 7.49E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.62E-06 | 7.51E-06 | 1.44E-07 | 7.51E-06 | 1.44E-07 | 0.00E+00 |
| WWP1 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.85E-02 |

# APPENDIX D: AERMOD ELECTRONIC FILES